


Memorandum

TO: Mr. Denny Darnold
Planning Director

FROM: Sheldon J. Johnson 
Transportation Group Leader

DATE: June 7, 1999

RE: Stageline Road Area Roadway Planning
Our File No. 97-99-101

The purpose of this memorandum report is to present the findings of a roadway transportation planning analysis of an area of southeast Hudson and adjacent environs. For purposes of this analysis, the area will be called the Stageline Road area. The study is being conducted in order to prepare a roadway plan intended to meet the future traffic demands in this area.

It must be realized that this is a plan that will require periodic analysis and revision as actual properties develop.

STUDY METHODOLOGY

The methodology that is used for this planning analysis is as follows:

- Define the study area.
- Prepare land use assumptions for the properties in the study area.
- Prepare estimates of traffic generated by the assumed land uses.
- Assign the trips to the planned/proposed area roadway system.
- Based upon the trip assignments, determine the lane requirements for the roadway system.
- Prepare a concept roadway system for the Stageline Road area.
- Provide documentation for the study process and results.

STAGELINE ROAD STUDY AREA

The area for which this study is conducted is bounded on the north by Interstate 94, on the east by STH 35, on the south by Tower Road, and on the west by the Carmichael Road/race track area. The study area is illustrated on Figure 1.

Within the study area, there are certain primary roadways that will be required to accommodate the majority of the future traffic. Some of these roadways exist and some are being proposed as a part of conceptual development plans that are being formulated by various area land developers. The roadway system that will be analyzed is depicted on Figure 2. There are certain

roadways, in or on the border of the study area, that while being affected by the future development, are not expected to change with regard to their present lane availability. Included in these roadways are I-94, Carmichael Road, and the new alignment of STH 35. With the exception of the above stated roadways, all existing public roadways in the study area are two-lane roadways at the present time.

ASSUMED LAND USE DATA

In order that analysis of transportation needs can be conducted, certain land use assumptions need to be made that would illustrate a buildout of the study area. A particular buildout year cannot be applied to these land use assumptions as that is a market driven value. It can probably be safe to assume that this area would not be fully developed before the year 2020, although much of it probably could be.

The assumed land uses and roadways have been used to establish traffic assignment zones (TAZ) for the study area. These zones are shown on Figure 3. The land use assumptions for the area were developed in conjunction with City staff and from concept land use plans submitted by developers. These land use assumptions are provided in Table 1.

TABLE 1
STAGELINE ROAD STUDY AREA LAND USE ASSUMPTIONS

TAZ Number	Land Use
200	Race Track
201	Commercial / Retail
202	Commercial / Retail
203	Hospital Residential
204	Office Quarry
205	Business / Industrial Park
206	Park
207	Residential
208	Hotel Medical Office Office Restaurant Theater
209	Residential
210	Commercial / Retail Residential
211	Business / Industrial Park
212	Residential Commercial Retail
213	Commercial / Retail Office
214	Residential Commercial / Retail

LAND USE TRAFFIC ESTIMATES

The traffic generated by the land uses has been estimated utilizing trip rate values contained in the Institute of Transportation Engineers (ITE) report titled Trip Generation, 6th Edition, 1997. The estimates have been prepared for the morning and afternoon peak hours and on a daily basis. The estimated volumes for each TAZ is shown on Table 2.

The volume totals shown on Table 2 are indicative of the summation of all of the land uses analyzed as "freestanding" land uses. In reality, there are internal – internal trips made within various zones and between certain zones. The total estimated volumes can be reduced by approximately ten to fifteen percent to account for these internal trips. Therefore, the assumed new growth for the zones generates an estimated 55,000 trips for assignment to the area roadway system.

Again, it must be emphasized that these volumes are planning level volumes based upon assumed development of land use types for the study area.

TRAFFIC VOLUME ASSIGNMENTS

The estimated volumes have been assigned to the area roadways in order to determine the general levels of volumes that could be expected at buildout of the study area. The assignments have been conducted for the morning peak hour, afternoon peak hour, and for a twenty-four hour (daily) basis. The morning peak hour volumes on the roadway segments are shown on Figure 4 and the afternoon peak hour volumes are on Figure 5. The daily trips generated are illustrated on Figure 6.

The trip estimates shown on Figures 4 through 6 are those trips generated by the new land uses assumed for this study. The other component of the future volume picture consists of the through volumes and/or volumes attributed to existing land use. This will be referred to as background traffic. Existing daily traffic data for the study area consists only of 1997 average annual daily traffic information for Carmichael and STH 35. These volumes are as follows:

Carmichael – 6,900 north of Hanley Road
Carmichael – 26,000 north of Crestview
STH 35 – 11,800 south of I-94

Additionally, using count data from the loop detection at the signalized intersection of Carmichael with Crestview/Stageline, the daily volume on Stageline is approximately 1,200 vehicles just east of the intersection.

For purposes of this study, the following lists the background conditions daily volumes on the various roadways that are assumed for a 20-year projection under a no-build condition. These background volumes are then added to the development generated trips that have been estimated in this study.

Stageline Road – 2,000
Hanely Road – 3,000
O'Neil Road – 1,000
Tower Road – 1,000

TABLE 2
ESTIMATED TRAFFIC VOLUMES BY TAZ¹

TAZ	New Land Use/Size	Estimated Traffic Volumes				
		A.M Peak Hour		P.M. Peak Hour		Daily
		IN	OUT	IN	OUT	
200	Race track	----	----	----	----	----
201	Commercial/Retail ² 140,000 SF	70	45	201	218	4,808
202	Commercial/Retail ² 300,000 SF	150	97	431	467	10,300
203	Hospital/Clinic Residential	60 ----	20 ----	30 ----	80 ----	1,460 ----
204	Quarry Office – 164,000 SF	225	31	41	203	1,805
205	Business/Industrial Park – 30 AC	89	18	23	87	664
206	Park	5	5	5	5	100
207	Residential 30 Single-Family 216 Multi-Family	5 20	17 90	19 90	11 44	287 1,430
208	Hotel – 200 Rooms Medical Office 75,000 SF Office 575,500 SF Restaurant (2) 6,000 SF and 8,000 SF Theater – 200 Seats	45 146 730 68 ----	83 36 111 61 ----	61 74 129 91 138	55 200 656 61 9	1,822 2,700 5,830 1,824 1,872
209	Residential 475 Single Family	89	267	307	173	4,545
210	Business/Industrial Park – 73 AC	215	44	56	211	1,608
211	Business/Industrial Park – 80 AC	237	48	62	231	1,767
212	Residential 84 Single-Family 204 Multi-Family Commercial/Retail ² 174,000 SF	16 17 87	47 87 56	54 84 250	31 42 270	804 1,352 5,475
213	Office 107,000 SF Commercial/Retail ² 100,000 SF	147 50	20 32	27 144	132 155	1,178 3,434
214	Retail Center 167,225 SF SR. Housing 213 Units	105 25	67 21	300 21	325 25	7,180 426
Totals		2,601	1,303	2,638	3,691	63,171

¹ Volumes generated by new development

² Commercial/retail uses shopping center trip rates discounted by 20 percent

The projected daily volumes, including the background conditions and land use buildout volumes, are shown on 7.

ROADWAY SYSTEM ANALYSIS

The analysis consists of a review of the area with regard to a functional classification and spacing of roadways. Following that, the ability of the roadways to accommodate the expected volumes is conducted. This analysis considers the capacity (lane values) needs and relates those to the volume demands.

The proposed functional classification of the roadways in the study area is shown on Figure 8. Regional arterials include I-94 and STH 35. Other arterials include the following:

- Hanley Road extended from Carmichael to STH 35.
- Carmichael.
- Stagline Road from Carmichael to STH 35.
- Tower Road from CTH FF to STH 35.

Collector facilities consist of O'Neil Road and a new north-south corridor, west of STH 35, connecting Stagline Road to Tower Road. Two east-west facilities located in the existing business park area can also be established as industrial collectors.

The number of lanes that will be required to serve the estimated buildout condition can be evaluated by a review of the hourly and daily projections. A roadway that has a daily volume ranging from ~~13,000~~ 12,000 to 15,000 and greater is one that normally is considered for four traffic lanes (two in each direction). Volumes below that can be adequately accommodated on a two-lane section as long as proper access control and intersection lanes are provided.

Volumes per lane that range from 700-900 vehicles per hour is the upper level of adequacy for a two-lane roadway. Proper planning indicates that a two-lane roadway that experiences per lane values of 700-900 vehicles per hour should be considered for upgrading to a four-lane roadway in order to provide adequate safety and capacity.

Using the above criteria, the number of traffic lanes recommended to accommodate the buildout volumes are shown on Figure 9. Sufficient right-of-way should be made available to preserve the ability to provide roadways with the recommended lanes shown on Figure 9. As development occurs, provision of left and right turn lanes at intersections along these arterials and collectors would be analyzed with submission of development plans. A traffic study should be required for each development as it is proposed to the City of Hudson.

RECOMMENDATIONS

The following recommendations are derived as a result of the Stageline Road Area Study:

1. The functional classification system shown on Figure 8 should be the guideline for area roadways.
2. Sufficient right-of-way should be made available to accommodate the lane requirements shown on Figure 9.
3. Timing of construction for improved/upgraded roadways will be determined by development activity.
4. Traffic impact studies of each development proposal should be required of the developer in order to determine access locations and intersection/traffic control design.
5. This study should be updated every 3-4 years or sooner if development occurs at an accelerated pace.